

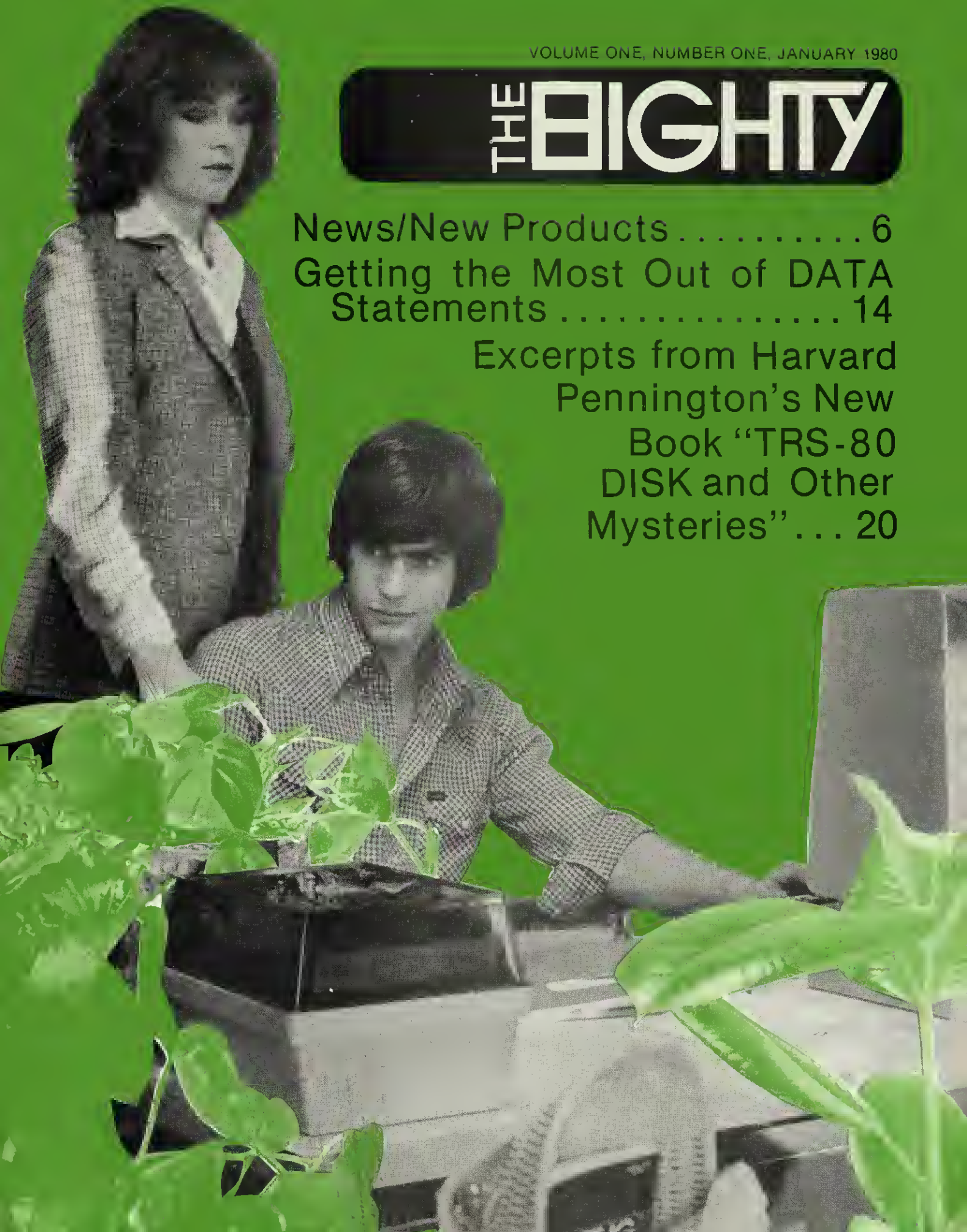
VOLUME ONE, NUMBER ONE, JANUARY 1980

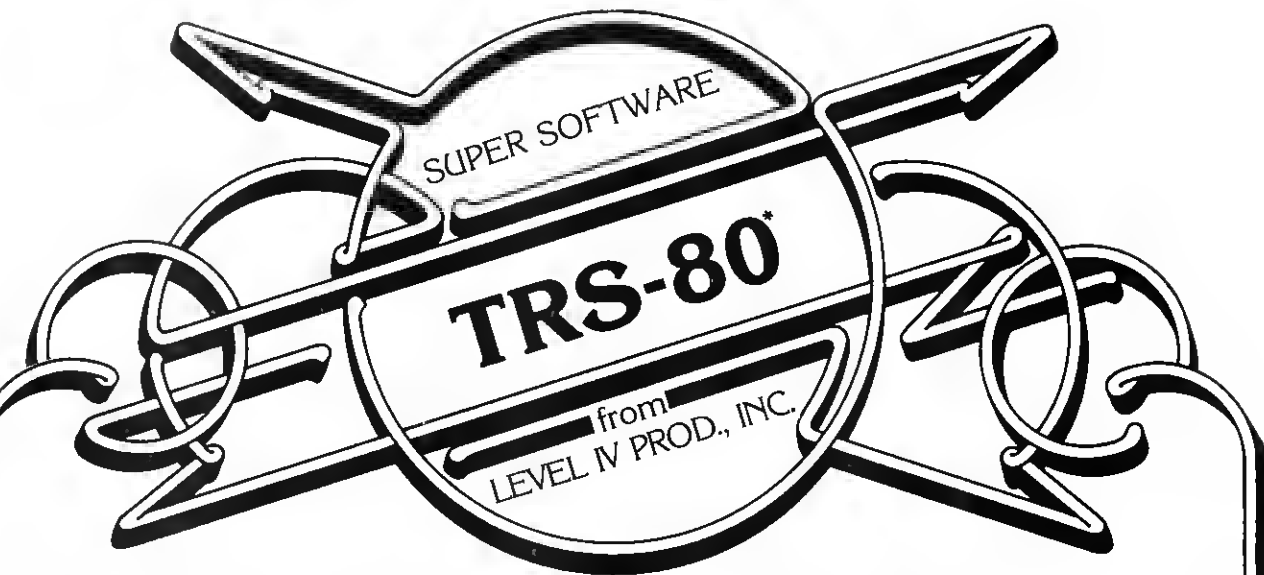
# THE EIGHTY

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Excerpts from Harvard  
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Animated Hangman - L IV	7.50	Checkers Disk - TSE	24.95	Sargon II - Hayd.	29.95
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Ham Radio - TSE	14.95	Concentration W/S - 80US	9.95	Tshort - Web.	9.95
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Object System - TSE	9.95	DCV-1 - SSS	9.95	XREF Cass - L. Micklus	19.95
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## LEVEL IV PRODUCTS, INC.

32238 Schoolcraft • Livonia, MI 48154 • 313-525-6200 outside Michigan 1-800-521-3305

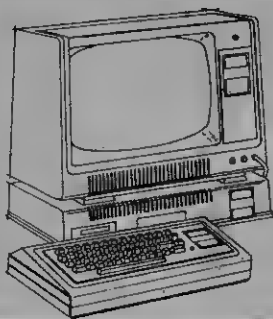
### 10% Off All Software Listed

If you don't see what you want call, find out why! We carry nothing but the BEST. We also sell TRS-80\* 10% off list price.

We ship C.O.D. - Add \$1.50 for shipping and handling **Send 25¢ for Catalog**

\* Product of Tandy Corporation

From ACCESS UNLIMITED...



## TRS-80 Owners Save on Equipment & Software!

We buy in quantity. You buy at discount. Brand new factory-warranted products from Apparat, Percom and other best-rated companies.

Order today, call toll-free: 1-800-527-4196†



### Percom Mini-Disk Systems

These mini-disk systems from Percom store more data, are more reliable. TFD-100™ units store 102K bytes of formatted data on *either* disk surface. TFD-200™ drive systems provide 197K bytes of formatted data on-line. (35-track Tandy

drives store only 86K bytes.) Access times are fastest possible with your Expansion Interface. Heavy duty power supply — included with each drive — runs cooler, lasts longer. Low noise three-wire ac power cord is safer than RS two-wire cord. Multiple drive systems are mounted in a single enclosure. Enclosures are finished in compatible silver enamel. Prices:

TFD-100™ (40-track)	
One-Drive Add-On .....	\$ 374.95
Two-Drive Add-On .....	749.95
Three-Drive Add-On .....	1124.95
TFD-200™ (77-track)	
One-Drive Add-On .....	\$ 634.95
Two-Drive Add-On .....	1268.95
Three-Drive Add-On .....	1903.95

Price includes Percom PATCH PAK™ described elsewhere in this ad.

### Disk System Interconnecting Cables

Improved design places drive 0, which includes the cable termination, at the end of the cable — not in the first position like the RS design — to eliminate the reflected noise of an unterminated cable and thereby improve data and control signal integrity. Prices:

Two-Drive Cable .....	\$ 24.95
Four-Drive Cable .....	34.95

### Power Line Filter

Eliminates switching spikes and other noise caused by equipment sharing the TRS-80\* ac power line. Also reduces TV interference caused by the TRS-80.\* 115/250 V, 50-400 Hz. Instructions for easy installation in standard aluminum mini-box chassis. Price .....

\$ 19.95

### Media

#### Minidiskettes:

10 Disks in a convenient plastic organizer box .....	\$34.90
Single Disk .....	\$ 3.49

#### Cassettes:

These data cassettes provide orders-of-magnitude improvement in data integrity over ordinary audio cassettes. Features include a piston-coated pressure pad which eliminates lint and minimizes erratic tape motion, and an energy-absorbing foam pad that is superior to a leaf-spring-mounted pad which tends to oscillate and cause fluttering. Five-screw case virtually precludes deformation during assembly.

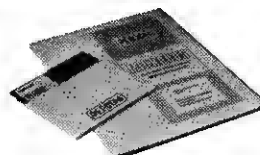
Pilon-10™ .....	\$1.95 ea
Pilon-30™ .....	\$1.99 ea

### How to Order

Order by calling Access Unlimited toll-free on 1-800-527-4196†. Mail orders also accepted. Orders may be charged to a VISA or Master Charge account, or paid by a cashier's check, certified check or money order. We accept COD orders with 25% deposit. Sorry, we cannot accept personal checks. We pay shipping and insurance charges on orders over \$1,000.00. Add approximate insurance and shipping charges for under \$1,000.00. If in doubt about these charges, ask when you call in your order. Texas residents include 5% sales tax. Minimum order: \$20.00. Allow 2 to 4 weeks for delivery.

†Texas residents call (214) 494-0206

Prices and specifications subject to change without notice.



### Disk System Software

**MICRODOS™** an advanced, easy-to-use operating system for TRS-80s\* using Percom disk storage systems, works entirely with

Level II BASIC commands. MICRODOS™ replaces primitive TRSDOS\*, is more powerful and faster, yet resides in only 7K bytes of RAM. Up to 10 user-defined functions may be added to existing functions, and hexadecimal constants may be used in expressions. MICRODOS™ is supplied on a system minidiskette that also includes three self teaching BASIC language programs: (1) a file management program, (2) a disk utility program — illustrating how disk utilities may be written with only a few BASIC statements, and (3) a sample application program. The application program is an expandable, user accessible "notebook" of information about MICRODOS™ BASIC statements. Price \$29.95

**PATCH PAK™** is supplied free (on disk) with the purchase of a Percom TFD-100™ or TFD-200™. PATCH PAK™ extends TRSDOS\* to accommodate 40- and 77-track drives. It also de-glitches TRSDOS\* 2.1. With the patch applied to TRSDOS\* 2.1, interference with disk operations from the TRS-80\* "heartbeat" pulse is eliminated, as is premature stopping of the drive motor during operation — a problem sometimes referred to as "silent death." PATCH PAK™ is applied to your system disk "on the fly" using two drives. Application instructions are included.

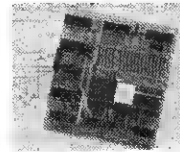
Price (if sold separately) ..... \$10.00

**new DOS, new DOS+ —** Disk operating system corrects and improves TRSDOS\* 2.1. Fixes keyboard bounce. Fixes APPEND, LOC and VERIFY. Fixes SYS3 bugs which crash the disk directory, and bugs which cause "Lost Data" errors. Enhancements include: machine language line renumbering program • faster LOAD & SAVE functions • space saving allocation of minidiskette granules • password disable/re-enable capability • validity check of output to disk — and more. new DOS+ also includes these exceptional utilities: Editor/Assembler with tape & disk I/O and output to line printer • disk-based disassembler with output to line printer • SUPER ZAP — Apparat's hex dump utility • Level I ROM located in Level II RAM • LMOFFSET for Tape/Disk transfers — and more. Prices:

new DOS .....	\$49.95
new DOS+ .....	\$99.95

### New! the SEPARATOR™

This PC board plug-in adapter for the TRS-80\* virtually eliminates data read errors (CRC error — Track locked out!) which occur on high density inner disk tracks when clock and data bits are not reliably separated during playback. This problem has plagued many TRS-80\* systems. The SEPARATOR™ is installed in the Expansion Interface without modifying the host system. Caution: Opening the TRS-80\* Expansion Interface may void the limited 90-day warranty. Price .....



## ACCESS UNLIMITED

315 N. Shiloh · Ste. D1 · Garland, TX 75042

(214) 494-0206

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# Welcome to the Pages of The Eighty

What, another new TRS-80 publication? Aren't there dozens already? We know of at least two dozen, but there is currently no reasonably priced advertising medium with a significant percentage of TRS-80 owners on the subscription list. Even our own SoftSide, one of the leading TRS-80 publications, reaches a mere 5% of TRS-80 owners; and SoftSide does not accept outside advertising.

Radio Shack is in no way eager to advise its customers that there are many independent suppliers of excellent peripherals and software for the TRS-80 microcomputer. Yet, in fact, many of the suppliers offer products far superior to those of Radio Shack, and usually at better prices. For example, other drives outperform Radio Shack drives, yet cost significantly less. Much of Radio Shack's software is months behind the market, and often of dubious value.

We feel that the solution is to offer a bargain to both TRS-80 owners and advertisers. The Eighty is free to any TRS-80 owner who requests it. This first issue is going to over 17,000 TRS-80 owners and users: people who subscribe to SoftSide or its sister publication, PROG/80; customers of The Software Exchange, the largest independent source of software for Radio Shack computers; and customers of HardSide, one of the largest retailers of new and used Radio Shack computer equipment.

We have modest expectations. We have been disturbed and annoyed by the outrageous claims of some in the microcomputer industry. We have even seen a publisher go so far as to claim 50,000 readers for a TRS-80 magazine that didn't even exist at the time of the claim, with an attempt to charge advertisers accordingly! We simply invite advertisers to try us at minimal cost, and compare the results.

We do not intend to inflate our circulation artificially by dropping bundles of The Eighty in the mail to computer clubs and college campuses where only one copy in twenty will ever be picked up. One of our staff was an officer in a midwest computer club where dozens of newsletters and free magazines sat untouched on a side table during the meeting, only to be thrown away at the end of the meeting. We have seen the same process with the same publications at college computer centers.

If a club does desire copies of The Eighty, we shall be happy to provide a modest number of copies for one-time distribution, but ask that those who wish to continue receiving The Eighty ask to be placed on the mailing list. There is no charge for this, but we ask that only people who own, operate, or plan to purchase a TRS-80 microcomputer subscribe.

We are happy to receive articles, reviews, and manufacturer's press releases for publication. Only products directly related to the TRS-80 will be covered. We do pay for articles and reviews not originating from a manufacturer or supplier.

## THE EIGHTY

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Roger Robitaille

**Editor**  
Bob Liddil

**Production**  
Sharon Demmerle

**Advertising Manager**  
Bill York

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**Address**  
The Eighty  
SoftSide Publications  
P.O. Box 68  
Milford, NH 03055

### Advertising Rates

Full	\$400	375	350	325
Half	\$240	225	210	195
Quarter	\$144	135	126	117

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### Submissions

Articles, Reviews, and Press Releases are welcome and will be published as space permits. No compensation is offered for commercial submissions. Individual authors are compensated at \$20 a page.

\*Note: Radio Shack and TRS-80 are registered trademarks of the Radio Shack, Division of Tandy Corporation.

# 'This TRS-80\* fascinates my whole family!'

## 50 unique programs for all ages

A package of fifty different game, quiz, instructional, educational, financial and fun programs are available for any TRS-80. Every member of your family will enjoy the TRS-80 with this set of programs called "The Fascinating Fifty." And it is reasonably priced at \$24.95.

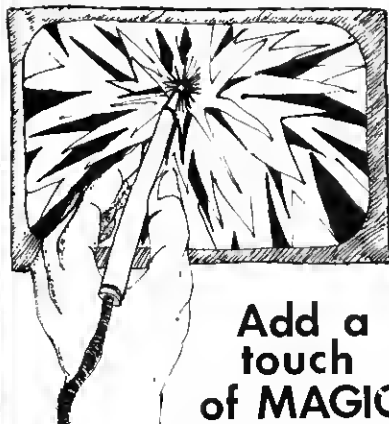
Designed for the whole family, these programs are fascinating. Have fun playing MANCALA or ZOO BREAK, guessing WORLD RECORDS or U.S. PRESIDENTS, learning MOON PHASES or WORD COMPLETION and using FINANCIAL TIMETABLE or METRIC CONVERSION. Other programs include: Rocket, Bingo, Dice, Reverse, World Population, World Area, States, Air Distance Between

Cities, World Population by City, Grade Averages, Number Base, Accounts Receivable, Loan Amortization, Interest From Savings, Business Ledger, Calendar, World Clock, Blackboard I, II, III & IV, Maze, Letter Recognition, Numeral Recognition, Right Reading, Word Recognition, How Many, Add On, Take Away, Learn To Spell, Sounds Like, Story Telling, Multiply, Divide, Fractions, State Capitals, Foreign Capitals, Cub Reporter, Spelling - Grade 4, 5 & Jr. High, and Test Your Vocabulary.

If you would like every member of the family to enjoy your TRS-80, today order your copy of "Fascinating Fifty" by Neal Jensen for only \$24.95.

## Galactic Empire

by Douglas G. Carlston  
This is fantastic! "Galactic Empire" opens up a three dimensional universe for exploration and conquest. While travelling through space you command the Imperial Forces of Galactica, your ship's senior officers and its computer. You must plan your construction of additional support craft and their arrival at nearby planets. Increase your strength by taxing and enlisting additional troops from the varied and unique planets you conquer. Besides maneuvering in a three-dimensional universe which changes from game to game, your use of time to travel between planets is very important. Good graphics and the sophisticated strategy make this game much different from any "Star Trek" or "Star Wars." Explore the galaxy for \$14.95. You'll love it!



Add a touch of MAGIC

## with a Light Pen.

With only a few lines of BASIC, any program can accept inputs by touching the light pen on the video screen. Hundreds of applications! For only \$19.95 you receive the light pen, instructions on using it in your programs, several sample programs, and a cassette of three light pen programs. This is the standard pen which several software companies support.

## DUNJONQUEST

### Datestones of Ryn

from Automated Simulations  
In this microquest you are Brian Hammerhand on a mission into the Haunted Mountains and Underground lair of Rex the Reaver and his band of thieves. A perfect introduction into the Dunjonquest series which started with "The Temple of Apshai." 16k \$14.95. Also available "Temple of Apshai." \$24.95.



## Invader

from Level IV  
Machine language arcade game with sound. \$14.95

## Adventure

by Gordon Letwin from Microsoft  
The complete Adventure is the ultimate fantasy game which allows you to explore the "Colossal Cave." This is the same as originally written for the DEC PDP-10. It fills an entire disk and requires 32k. For just \$29.95

## Video Speed Reading

from Instant Software  
Using the scientific principle behind the tachistoscope, a mechanical device used to flash characters or words on a screen, this three-part package will train your eyes and mind to quickly recognize numbers, letters, words and phrases. \$7.95

## Personal Inventory

from Southern States Systems  
Designed to allow you to develop an inventory of your personal possessions for insurance purposes, you record for each item its description, serial number and value. Permits sorting, modifying and other record manipulations with storage on cassette tape. \$12.50.

## TRS 80 Disk & Other Mysteries

by H.C. Pennington

We don't usually list books, but this one is so unique that we thought you would want to know about it. There are over 100 pages about how DOS works, how a disk is organized, and how to recover from errors. This is THE technical backup for NEWDOS+ with great illustrations. \$19.95.

## Disk\*Mod

by Roy Soltoff from Misisys

This machine language program modifies your copy of the Radio Shack Editor/Assembler for use with your minidisk and any disk operating system. You can save and load both text source and assembled object files. Unlike the NEWDOS+ version you can read the directory and the space used and available while in the EDTASM. You can also kill files. It is a complete disk modification for one or more drives.

Other capabilities are also added which are not found on NEWDOS+. The block move command relocates a section of text to any other area. The global change command permits, for example, changing a label throughout the text. The pagination feature provides hardcopy on 8 1/2 by 11 pages on either single sheets or continuous paper. In addition, high memory can be reserved, like in BASIC, for machine language routines like printer drivers. You can also display the amount of memory remaining.

The <CLEAR> key is functional, the symbol table is sorted alphanumerically and output 5-across, the scroll up/down allows 15 lines on the screen, and the 'DEFM' assembly is improved. Lower case input is now permitted and you can branch to any address. Plus, it also corrects the errors in the Radio Shack tape version.

Save your time and make full use of your disk system by upgrading your Editor/Assembler today. \$19.95

## System Doctor

from The Bottom Shelf

Assure yourself that your TRS-80 is working properly. The causes of hardware problems are often hard to detect, but you can now do a thorough diagnostic check of your entire computer. It checks the ROM, the RAM, disk drives, video memory and display and cassette recorder. Also provided is a special test tape and a 12-hour test with a recording of results to find those occasional errors. \$28.50. On disk \$38.50

THE PROGRAM STORE

4200 Wisconsin Ave NW  
PO Box 9609 Dept 6  
Washington, D.C. 20016

YES please send me these TRS-80 programs:

title price

\_\_\_\_\_

postage: \$ 1.00

total: \_\_\_\_\_

name: \_\_\_\_\_

address: \_\_\_\_\_  
city, state \_\_\_\_\_  
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☐ Check payable to The Program Store

☐ MASTERCHARGE mc bank code: \_\_\_\_\_

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signature: \_\_\_\_\_



# New Products

The Eighty is happy to publish information about new products related to the TRS-80\*. We cannot be responsible for the accuracy of the information presented here, and those with questions are asked to contact the indicated companies directly.

\* Trademark of Radio Shack Division of Tandy Corp.

## SOFTWARE CATALOG

Creative Computing Software announces the publication of a comprehensive catalog of personal computing software. An array of over 400 programs, on 70 tapes and disks, makes it a good sourcebook for micro-computer software. It includes complete program descriptions to aid the education, small businessman, or home user in choosing the software necessary to make micro-computing a worthwhile venture.

The catalog is free. To order, or for more information contact Creative Computing, P.O. Box 789-M, Morristown, NH 07960.

## OPERATING SYSTEM

A fully-CPM-compatible operating system for the new Radio Shack TRS-80\* MOD-II Computer has been announced by MPU in San Carlos, California. The new operating system will work with CBASIC and ALL OTHER CPM programs, requiring ab-

solutely NO CHANGES to the operating codes. Source and object files will both work on the system, and programs from MPU and other CPM code-suppliers will be fully compatible.

The entire operating system sells for \$249.95, and opens an entire library of already existing programs to the MOD-II owner.

For more information write MPU at Post Office Box 808, San Carlos, California 94070, or call toll-free anytime (800) 824-7888 and ask for Operator 883 to take your name and address and information will be sent to you (in California call 800-852-7777). Dealer inquiries are invited.

## SUPER ISOLATOR



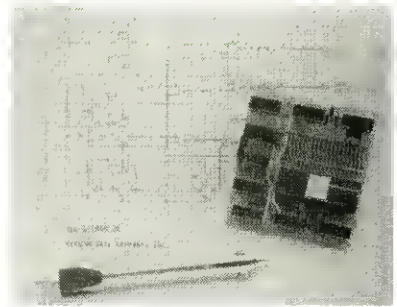
ELECTRONIC SPECIALISTS announces the expansion of its ISOLATOR line. MODEL ISO-3 comprises individual SUPER-FILTERING for each of three 3-prong sockets. Heavy duty spike and surge suppression is also included.

Intended for MICRO-PROCESSOR installations in industrial or severe interference prone environments, the SUPER ISOLATOR also provides protection against damage from lightning and electrical machinery spikes and surges.

Connecting to the AC line with a standard 3-prong plug, the MODEL ISO-3 can isolate and protect an 1875 watt total load, with each socket capable of isolating a 1000 watt load. Protects against extreme interference. \$79.95.

For more information contact Frank Stifter, ELECTRONIC SPECIALISTS, INC., 171 SOUTH MAIN STREET, NATICK, MASSACHUSETTS 01760. Phone (617) 655-1532.

## PLUG-IN ADAPTER



Percom Data Company is now offering a plug-in adapter for the TRS-80\* and Southwest Technical Products' MP-F mini-disk controllers which virtually eliminates the data read errors caused when clock and data bits are not reliably separated during playback.

Called the SEPARATOR, the adapter may be installed without making any changes to the host system. The user merely removes the 1771 disk controller IC from the host controller, installs the IC in the DIP socket on the SEPARATOR card and then plugs the card into the vacated 1771 socket of the host system.

The problem of unreliable data separation of the TRS-80\* and SWTP controllers was traced by Percom engineering personnel to the use of the internal data separation circuit of the 1771 IC in these controllers, a practice which the disk controller IC manufacturers warn "is not recommended for applications requiring high data recover reliability..."

An assembled and tested SEPARATOR adapter sells for \$29.95, including installation instructions.

The data separators are available from HardSide, or direct from Percom.

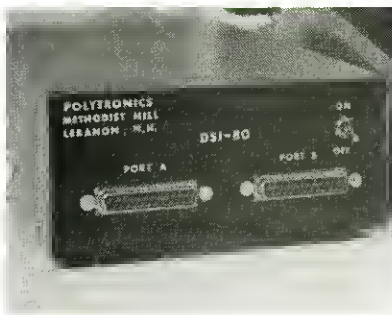
Dealer inquiries are invited.

## KEYBOARD MOD KIT

There have been many articles about adding lowercase to the TRS-80\*. The directions for installing lowercase and a control key are even included in The Electric Pencil Operator's Manual. If you know what you are doing it's not hard, but if you have never taken apart a microcomputer before you may feel a little intimidated. Finding all the right parts is not easy either. There is a kit which includes everything you need... wire, solder, control key, 2102 memory chip, slide switch, and mounting hardware.

The lowercase & KEYBOARD Modification Kit is distributed by Emmanuel B. Garcia, Jr & Associates, 3950 N. Lake Shore Dr., Rm 2310, Chicago, Illinois 60613. Price is only \$19.95 each. Dealer discounts available on quantity orders.

## DUAL SERIAL INTERFACE



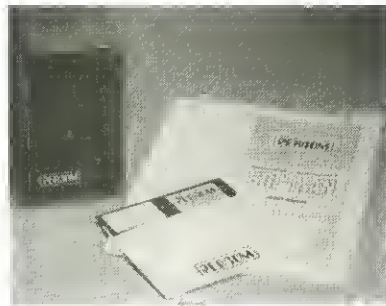
Polytronics Corporation, Lebanon, N.H., announces the availability of the DSI-80, a dual serial interface for use with the Radio Shack TRS-80\* microcomputer. The unit, complete with manual, cassette tape and 6-month warranty is available for a limited time only at the introductory price of \$199.95.

The DSI-80 provides two serial output ports with both current loop and RS-232 interfaces. Speed selections of 110, 150, 300, 600 and 1200

baud are accomplished by jumpers requiring no special tools or soldering. The unit is built to MIL-specs and burned in for a minimum of 120 hours before shipment. All integrated circuits are socketed. The timebase is crystal controlled.

The cassette tape provided with the DSI-80 contains several I/O programs written in BASIC, intended to show how other BASIC programs can use the interface. Additionally, the tape contains system programs, written in assembly language to patch the BASIC interpreter in the TRS-80\* so that common time-sharing-type terminals can be used to run Basic, and to receive output from the LPRINT and LLIST commands. In fact, the screen portion of the Radio Shack computer is no longer necessary when a standard terminal and the DSI-80 interface is available.

## SOFTTRAN



Percom Data Company is now offering a translator program which converts files on soft-sectored minidiskettes for use with Percom LFD-400™ hard-sectored mini-disk drive systems.

The program, called SOFTTRAN™, is available in versions to convert files operating under mini FLEX†, FLEX 2.0† and Smoke Signal Broadcasting Company's DOS.

The significance of SOFTTRAN™, according to Mauch is that it makes the Percom LFD-400™ a universal mini-disk storage system.

Mauch said no minidiskette programs from all of the prin-

cipal 6800 software suppliers — Technical Systems Consultants (TSC), Computerware, Ed Smith's Software Works and of course Percom — may be used with the LFD-400™.

SOFTTRAN™ copies soft-sectored minidiskettes track-for-track onto hard-sectored minidiskettes. If the minidiskette includes a FLEX or SSB DOS, the DOS is modified to function with the Percom LFD-400™.

Translation of mini FLEX and SSB DOS minidiskettes results in more than 10% additional storage space becoming available than required for the soft-sectored version.

For more information contact: Percom Data Company, 211 N. Kirby, Garland, Texas 75042. Phone: (214) 272-3421.

## NEW SOFTWARE

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Talented and Academically Gifted (T.A.G.) program that obtained a TRS-80 computer in January of 1979 with a grant from the New Jersey Department of Education.

Because of their enthusiasm for the TRS-80 and the success they have had with it in the classroom, the students at Woodland School were filmed recently for the syndicated children's television program, **Kidsworld**, using the TRS-80.

**Kidsworld** is a children's program designed to give youngsters an opportunity to report what is going on in their world. All ideas for the content of the program are submitted by the youngsters themselves on anything of Interest or Importance. The program with the Woodland School T.A.G. group is being televised in major cities across the nation.

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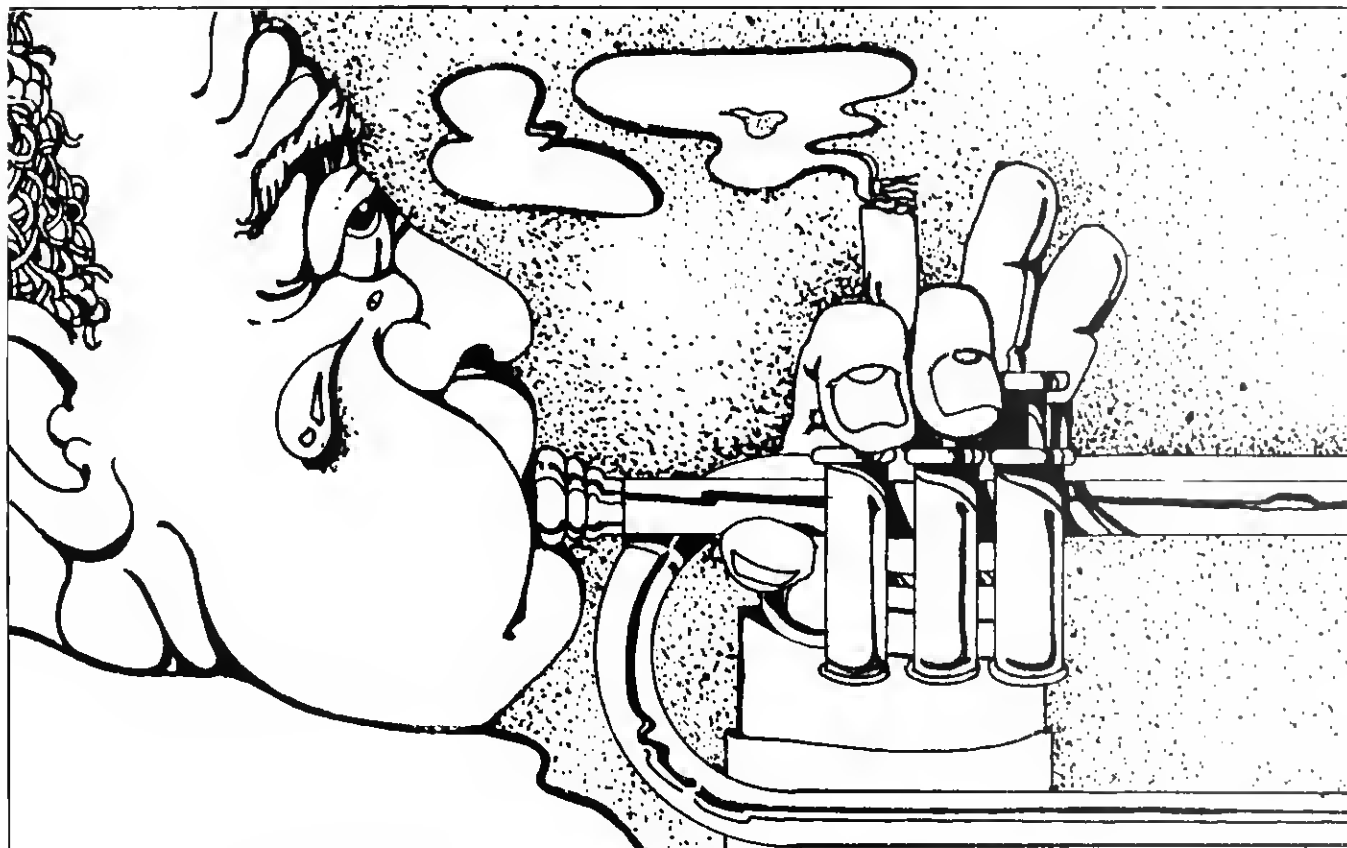
ASPTCH also has its own unique keybounce routine that may be reinitialized after entering fully programmable BASIC (it speeds up BASIC execution).

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READER SERVICE: P



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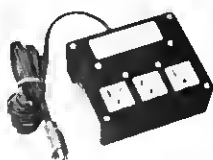


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If you are serious enough about disk programming to own RSM-2D or NewDOS+, then you ought to purchase this book. It explains the organization and features of TRS-DOS 2.0, 2.1, 2.2, NewDOS, and VTOS, tells you how to use Superzap, RSM-2D, Monitor 3, Debug, Dircheck, and LMOffset, explains the directory track on the disk, file structures (including Electric Pencil files), and even gives detailed procedures for recovery of lost data. While this book is not recommended for the inexperienced user, it is essential for the serious disk programmer. The book is expensive, in 8½ by 11 format with typewritten instead of typeset printing, and only 130 pages, yet the information is worth the price.

This valuable reference book for the hardware enthusiast with an understanding of Assembly language programming includes the schematic, printed circuit board artwork, and instructions for building a TRS-80 breadboard, plus 18 experiments to give a solid understanding of interfacing to the TRS-80.

READER SERVICE X

As I look back to the time when I first started programming in BASIC (after buying a Radio Shack computer and working my way through the Level I User's Manual), I really don't think I can do a lot more now than I could then. In programming, experience usually teaches you better ways of doing the same things.

For example, if you want to put a value in a variable, there are several ways to do it. If you want to put the word ALBATROSS in the string variable A\$, here are some ways to accomplish it:

- 10 A\$ = "ALBATROSS"
- 10 INPUT A\$
- 10 FOR A = 1 TO 9  
20 I\$ = INKEY\$: IF I\$ = " " THEN 20  
30 A\$ = A\$ + I\$: NEXT A enter from keyboard
- 10 INPUT #1, A\$ enter from cassette or disk sequential file, if open
- 10 OPEN "R", 1, "BIRDS" enter from random disk file  
20 FIELD #1, 9 AS A\$  
30 GET 1, 1
- 10 DATA "ALBATROSS"  
20 READ A\$

All of these methods accomplish the same thing. As a general rule, if you have only a few items to be stored as variables, the first method is often best. If the variable is chosen by the person using the program, the second or third methods are preferred. If there is a lot of data to be processed by the program, the cassette or disk files are necessary. In between, when you have a moderate amount of data that's the same for each run of the program the statements READ and DATA are probably the best choice, especially if you have to switch variables back and forth. When you need to use the same data more than once, a RESTORE statement makes DATA and READ even more powerful.

Before I give any examples, there is a flaw in Radio Shack Level II BASIC that should be mentioned. Sometimes READ statements will repeatedly read the first item of DATA. This is because the RESTORE flag is improperly set. If you have this problem, you will have to enter the statement:

(line number) POKE 16554, 255

before the first READ statement. Some computers even require this before each READ statement. The problem is often limited to certain programs on the same computer, and doesn't seem to occur in Level I or disk BASIC.

The statement DATA tells the computer that information on the same line is to be used in READ statements. In most computers, the data can be either numbers or letters. More than one item can be on the same line if items are separated by commas. Most computers require quotes around string data.

The statement READ tells the computer to fill a variable with the next unused item of data. Most computers will give an error message if you try to string data into a numerical variable, a number into a string variable, or if you have run out of data.

The statement RESTORE tells the computer to forget which data has already been read and start over with the first item in a DATA statement. This is how the RESTORE statement works. The computer keeps count of how many DATA items have been read, so that the next READ statement will read the proper data. RESTORE sets the "data pointer" back to the first item of DATA.

This program will demonstrate the three statements:

```
10 DATA "DATA", "MORE DATA", "STILL MORE DATA"
20 READ A$, B$
30 PRINT A$, B$
40 RESTORE
50 READ A$
60 READ A$, B$
70 PRINT A$, B$
```

Enter the program into your computer and run it. The sample run should look like this:

```
DATA          MORE DATA
MORE DATA    STILL MORE DATA
```

Line 10 is our DATA statement. Actually, it could be anywhere in the program and the program would still run the same. You may want to be convinced, so delete line 10 and enter line 35:

```
35 DATA "DATA", "MORE DATA", "STILL MORE DATA"
```

You may wish to try the same line in other places, particularly at the end of the program.

Since the DATA statements will work anywhere in the program, does that tell us it doesn't matter where we put them? The answer is, "Not really". The practical locations are: near the beginning of a program, at the end of a program, and (in exceptional cases) near the part of the program that makes use of the data. Wherever you put them, all DATA statements should be together. This is because you need to be able to tell which item of data is next to be read, and you can't count easily if you have to look all over the place.

For speed, data statements should be at the beginning of the program, as the interpreter starts to look at the first line. Most of the time, I like DATA statements at the end of a program. This is because my DATA statements are often edited, and I like to have them at the end when I type LIST. I've fallen into the habit of putting DATA statements at line 10000. I find putting them in the same place at different programs helps me get organized and work faster.

Because you often end up counting items of data, I like to put the same number of items in each statement (usually ten). It's easy to count by tens, and in addition, I can make the line numbers significant. For example, in a disassembler, I put the Z-80 Operation Codes in groups of ten, and the last three digits of the line number were the decimal equivalent of the starting Op Code.

When you're using RESTORE, careful thought should be given to the decision of whether or not to mix numerical and string data. In our sample program, line 50 was a "dummy READ". This is a READ statement that you don't use in the program, but rather one that's used to skip over an item of data to the next data item. If you put all your string data first and numerical data afterward, it's easy to find an item of data at random. If you had fifty items of string data and fifty items of numerical data, and you wanted the twenty-first item of numerical data, you could use this subroutine: (the DATA statements are not shown).

```
10 N = 21:GOSUB 100
```

```
-----
100 FOR S = 1 TO 50:READ A$:NEXT S
110 FOR S = 1 TO N:READ V:NEXT S
120 PRINT V
```

Line 100 does a dummy READ on the fifty string variables and line 110 does a dummy READ on the first twenty numerical variables saving the twenty-first in variable V.

Another way to accomplish the same task would be to pair string data and numerical data. Here is a short program to find the price of a sandwich, using paired data:

```
10 DATA "HAM", 1.5, "CHICKEN", 1.25, "CLUB", 2.25
20 INPUT "SANDWICH NUMBER";N
30 FOR A = 1 TO N:READ A$,P:NEXT A
40 PRINT A$;"SANDWICH-$",P
50 RESTORE
60 GOTO 20
```

Enter the program and try a few sample runs. INPUT the number 4 to discover what kind of message your computer gives for an OUT OF DATA error. For Radio Shack computers, you should get:

```
[Level I]      HOW?
(Level II)     OD ERROR IN 30
[Disk]        OUT OF DATA IN 30
```

If you consistently pair your string and numerical data, line 30 could handle more data than you're likely to put into a program. You could also group string and numerical data in any sequence using the same idea. For example, if you matched two string variables and three numerical values, you could change line 30 to:

```
30 FOR A = 1 TO N:READ A$, B$, P,Q,R:NEXT A
```

This could do a dummy READ on five variables at a time, so long as all your data was in this form:

```
10000 DATA "(string)","(string)",(number),(number),(number)
10010 DATA "(string)","(string)",(number),(number),(number)
```

When you group several variables like this, it's good practice to put each group in a separate DATA line.

As a final example of the power of a data statement, enter this program:

**[Radio Shack Level II and Disk BASIC only]**

```
10 FOR C = 1 TO 2:READ N
20 FOR A = 1 TO N
30 READ B:S$(C) = S$(C) + CHR$(B)
40 NEXT A
50 READ N$(C)
60 PRINT S$(C),N$(C):PRINT
70 NEXT C
80 DATA 12,130,188,188,188,188,191,189,188,188,188,140,
  "AIRCRAFT CARRIER"
90 DATA 7,176,176,188,176,176,144, "SUBMARINE"
```

This program mixes numerical and string data, uses data (N) to control the reading of more data, shows how to use data statements to form string variables of graphic characters, and demonstrates a method of using mixed numerical and string data in random format. To do a dummy READ, all you have to change is the subscripted variables. Try it by substituting S\$ for S\$(C), N\$ for N\$(C), and put the PRINT statement outside the FOR LOOP. Clear S\$ on each loop.

You can do a dummy READ because the first item in each data line tells the computer how many times to read the data.

The method of using string variables full of graphics characters is one of the most powerful techniques available for graphics. It makes fast animation possible, as is well demonstrated in Bee Wary, probably the best graphics program written in 1979 for the TRS-80 (Available from TSE, P.O. Box 68, Milford, N.H. 03055.)

Take the time to figure out for yourself what is happening in the sample program. When you understand it well, start trying to write your own programs using the same method. The ideas are simple, and to make them work for you, all you need is practice. Do it with DATA!

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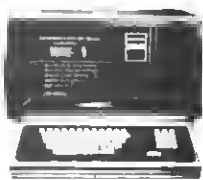
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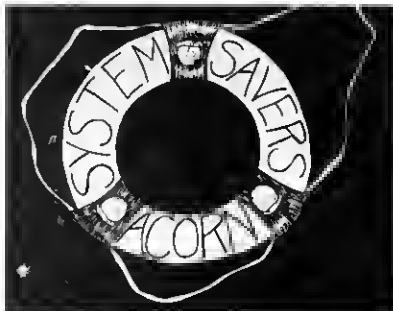
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Acorn produces several other utility programs for the TRS-80. These include "Aterm" and "Numbering" by Tom Stibolt; and "Disassembler", "Tape Utility" and "Disk Utility" by Roy Soltoff. All are available for less than \$20.00. Ask for these and other quality Acorn programs at your local computer store.

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## TRS-80\* DISK AND OTHER MYSTERIES

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This book is the best source of information currently available on the TRS-80\* TM Disk Operating System. It gives instructions for recovering lost data, understanding and reconstructing the disk directory, and using disk related programs and utilities including Superzap, RSM-2D, Monitor 3, Debug, Dircheck, LMOFFSET, and Electric Pencil.

Having received Mr. Pennington's permission to excerpt his book, the problem was to select portions that were short enough, complete in themselves, and which gave a fair selection of the book. Two such excerpts follow. The first one is Mr. Pennington's analysis of different DOS's available. The second is a last ditch method to recover a bad diskette.

Both selections Copyright (C) 1979 by Harvard C. Pennington and used by permission.

### 4.0 OPERATING SYSTEMS

This will be a brief review of the various operating systems that are available as of this writing. I will not dwell too long on the pros and cons of each and you must remember that the following is an OPINION, mine.

#### 4.1 "TRSDOS 2.1"

Except for the few unfortunate souls that started with 2.0 this is the operating system that most of us developed our first, genuine love-hate relationship with. For all practical purposes, due to the short life of 2.0, this was the 'FIRST' operating

system generally available for the TRS-80.

2.1 has many problems. Of course, Radio Shack never came out and admitted, in plain English, (at least to me -- did they tell you?) that the problems existed. TRSDOS 2.1 is adequate for most trivial programming requirements and a few serious applications IF you are prepared to tolerate an occasional lost file. If you contemplate any real serious applications I would not recommend that TRSDOS 2.1 be used, under any circumstance.

Data recovery on TRSDOS 2.1 generated disks is normal and routine for formatted data disks and system disks.

#### 4.2 "TRSDOS 2.2"

TRSDOS 2.2 is a huge improvement over 2.1. Most of the errors are corrected. However, it will still create errors. Most of the complaints I have about the system are that they still have not given the user any of the utility that is available with NEW DOS.

As far as data recovery goes, there is one major point. When you 'KILL' a file with 2.2, it ZEROS THE ENTIRE DIRECTORY ENTRY. There is not a single clue as to what was there or where it was! Since Radio Shack has no utility for looking at the disk, I presume it was to prevent all you "SUPERZAPERS" out there from finding out too much! However, if you need to recover something, this makes it not impossible but a genuine bitch because you have to go 'mucking around on the disk' looking for the file.

For this reason alone, I would not use this system on a serious application where I MIGHT have to recover 'KILL'ed data.

Data recovery on TRSDOS 2.2 generated disks is normal and routine on formatted disks and system disks except for the above described 'KILL'ed files.

#### 4.3 "VTOS 3.0"

This is Randy Cook's version of 2.2 with quite a few bells and whistles. Cook is the

author of Radio Shack's 2.1 and, I have reason to suspect, most of 2.2. This system has some nice features but is, in my opinion, VERY AGGRAVATING to use because of its 'BACKUP' protection feature. In the version that I used for evaluation, some of the commands did not work entirely as advertised. I'm sure that this will be corrected in a later release. On the whole, the system is good and the concepts are excellent. I have not used it enough, at this time, to have detected any errors, if it has any.

If you find it necessary to recover data or files that have been 'SAVE'd to a VTOS 3.0 system disk, you will not be pleased with the recovery procedures.

This is due to the fact that as a function of the VTOS 3.0 protection features, you will NOT BE ABLE TO RECOVER THE DATA TO ANOTHER DISK AND THEN 'RUN' THAT DISK!

In spite of all the nice features in this system, it is for this reason that I would not recommend its use with applications of other than, a trivial nature. Data recovery on VTOS 3.0 system disks is VERY DIFFICULT. You must first format a disk and then use the "SUPERZAP" 'BACKUP' function to transfer the information to the 'working disk'. YOU WILL NOT BE ABLE TO 'BACKUP' TRACK 0, SECTOR 4. You must 'SKIP' this sector when "SUPERZAP" tries to 'read' it from the 'SOURCE' disk. Then, when you have finished recovering the file, you must 'COPY' it back to a 'system disk' MADE FROM THE MASTER VTOS 3.0 YOU RECEIVED FROM MRS. COOK'S SON, RANDY.

VTOS 3.0 WILL NOT FUNCTION UNLESS TRACK 0, SECTOR 4 IS UNFORMATTED! (At least that's the way it appears.) This is how Randy Cook is able to protect his software from pirating. It is a great idea but it makes it extremely aggravating to use. For a new user who is trying to use an applications package transferred to this system, who is not familiar

with computers, nor does he want to be -- he just wants to press a button and have the damn thing run his application -- this system will not find much favor at all.

#### 4.4 "NEW DOS 2.1"

It works! The current release has no known bugs and will do everything Radio Shack says cannot be done. It corrects every KNOWN error in TRSDOS 2.1. All in all, there are over 200 additions, corrections, and enhancements to TRSDOS. Many of the 'improvements' in TRSDOS 2.2 are poor 'implementations' of NEWDOS 2.1. (That's an opinion, and I cannot verify it, but from the looks of things, I'd give better than even odds that it's true.)

NEWDOS 2.1 is oriented to the programmer as well as the user. Included in the NEW DOS+ package, are utilities such as "SUPERZAP" 'DIR-CHECK', 'LMOFFSET' and others. These utilities are especially designed to assist the user and are very necessary if you need to recover data.

Data recovery on NEWDOS 2.1 generated disks is normal and routine for formatted data disks and system disks.

#### 10.5 RECOVERING A PHYSICALLY DAMAGED DISK

This unfortunate circumstance can occur in many unpredictable ways. You could have accidentally scratched the disk while using it for a shoe horn or a pipe cleaner. It could have been carelessly handled by a store clerk who thought it was a Master Charge Card and ran it through his little machine. A friend who had just dropped by to visit after a taco eating contest picked it up with thumb and forefinger expertly placed on the head access slot.

In any case, this aggravation is handled in exactly the same way as described in 10.4.

**CAUTION - MAKE SURE THE FOREIGN MATERIAL THAT IS ON THE DISK IS SUFFICIENTLY ATTACHED SO AS NOT TO CON-**

**TAMINATE THE DISK 'READ/WRITE' HEAD.** If you determine that the disk surface has been contaminated with a foreign substance such as finger prints, coffee, hand lotion etc., here is one semi-drastic measure you may take that I have used successfully on one or two occasions:

- (1) CAREFULLY slit the back of the disk jacket and remove the disk. DO NOT TOUCH THE DISK SURFACE! HANDLE BY EDGES AND CENTER ONLY!
- (2) CAREFULLY wash the disk in warm soapy water using your WET AND SOAPY fingers to GENTLY STROKE (DO NOT RUB) the disk.

- (3) THOROUGHLY rinse the disk in warm water.
- (4) If soap and water did not do the job, add alcohol to the water and try again.
- (5) Repeat - 3.
- (6) Place the disk on a sheet of NEWSPAPER. WARNING - PAPER TOWELS LEAVE LINT! Lay another sheet on top. Press gently. Repeat until the disk is dry.
- (7) Under no circumstances rub the disk!
- (8) When the disk is dry, CAREFULLY reinsert it into A NEW JACKET - DO NOT TOUCH THE MEDIA! (Here is a good use for those diskettes that weren't any good and you couldn't bring yourself to throw away.)
- (9) BACKUP THE DISK IMMEDIATELY!

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